

Appendix I. Data Collection Sheets												
Three Sisters Springs Use Survey:							Winter 2014 - 2015					
Date	Day of Week					Observer(s)						
Enter only people and boats entering Springs Run												
Kayak, canoe or paddle board	Description	# boats / # people in boat	# of dogs	# swimmers & snorklers in water	# with fins & fin color	**Flotation device	In:	Out:	# In	Manatee In Time	Manatee Out Time	# Out
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												
33												
34												
*T=Tour Boat P=Private Motor Boat R=Rental Boat PB=Paddle Board K=Kayak C=Canoe ss = swim suit **L J = life jacket N = noodle For SUP enter SUP in Description column and record the # or other identifying marks												



Appendix II. Environmental Data: Water Temperature and Wind Speed and Direction							
		Mouth of Kings Bay <sup>1</sup>	Gulf near Shell Island <sup>2</sup>	Mouth of the Springs <sup>3</sup>	Ambient Air	Wind direction	Wind velocity <sup>4</sup>
Date	Time	° F	° F	° F	° F		
12/10/2014	7:00am	65.4	61.2	72	39		0
	9:30am	65.9	62.5				0
	12:00pm	67.3	63.9		62	W	8
	2:30pm	68.2	63.7			W	12
	5:00pm	66.1	61.5		58		0
12/13/2014	7:00am	62.9	57.0	72	34		0
	9:30am	63.8	57.7				0
	12:00pm	64.9	59.6		66		0
	2:30pm	66.9	60.0			WNW	8
	5:00pm	65.3	59.4		61	W	4
12/14/2014	7:00am	63.5	57.7	71	36		0
	9:30am	64.3	58.1				0
	12:00pm	65.7	59.5		65		0
	2:30pm	66.5	60.4				0
	5:00pm	66.3	60.1		61	W	7
12/16/2014	7:00am	66.2	59.7	73	52		0
	9:30am	65.1	59.7				0
	12:00pm	65.8	60.6		70	SW	4
	2:30pm	67.7	61.6			WSW	7
	5:00pm	68.7	62.6		70	SW	7
12/17/2014	7:00am	67.5	63.3	72	50		0
	9:30am	67.9	61.3			NE	4
	12:00pm	67.3	61.8		68	NE	4
	2:30pm	68.5	62.5			W	8
	5:00pm	69.6	63.3		62	W	4
12/20/2014	7:00am	66.7	61.9	71	50	ENE	3
	9:30am	67.4	63.0			ENE	4
	12:00pm	67.7	61.6		75	S	3
	2:30pm	65.5	61.1			NE	0
	5:00pm	65.8	61.9		72	NE	0
12/21/2014	7:00am	67.6	62.6	72	60	ENE	4
	9:30am	68.1	64.1			ESE	4
	12:00pm	68.5	62.8		66	NNE	4
	2:30pm	66.6	61.7			SSE	7
	5:00pm	66.1	62.3		65		0
12/23/2014	7:00am	68.5	64.6	73	68	SE	3.5
	9:30am	69.2	66.0			ESE	3.5
	12:00pm	70.1	67.3		74	SE	8
	2:30pm	70.3	66.1			SE	6
	5:00pm	69.0	65.5		75	SE	3.5
12/25/2014	7:00am	69.6	66.4	72	58		0
	9:30am	69.9	65.3			E	4
	12:00pm	69.9	67.7		62	E	6
	2:30pm	69.7	67.8				0
	5:00pm	70.2	66.6		63		0

		Mouth of Kings Bay <sup>1</sup>	Gulf near Shell Island <sup>2</sup>	Mouth of the Springs <sup>3</sup>	Ambient Air	Wind direction	Wind velocity <sup>4</sup>
Date	Time	° F	° F	° F	° F		
12/26/2014	7:00am	67.3	63.9	71	44		0
	9:30am	67.9	64.8			E	4.6
	12:00pm	68.6	66.1		68	E	7
	2:30pm	70.2	66.7				0
	5:00pm	69.4	65.7		69		0
12/27/2014	7:00am	68.0	64.2	72	54	ENE	4
	9:30am	68.6	65.1			E	4
	12:00pm	70.1	66.6		79		0
	2:30pm	71.2	67.6			W	5
	5:00pm	71.2	66.7		77	W	3.5
12/28/2014	7:00am	70.1	65.7	73	64		0
	9:30am	70.2	66.5				0
	12:00pm	71.3	67.8		80	W	4
	2:30pm	73.0	69.3			W	8
	5:00pm	73.0	68.4		73		0
12/30/2014	7:00am	73.1	69.8	74	68	NNW	3
	9:30am	72.8	69.1			N	8
	12:00pm	72.6	70.0		72	N	5
	2:30pm	73.2	70.7			N	6
	5:00pm	73.9	71.4		72	NE	4
12/31/2014	7:00am	71.5	70.3	72	58	NE	8
	9:30am	70.8	68.2			ENE	10
	12:00pm	70.7	67.1		61	NE	11
	2:30pm	70.7	68.0			ENE	10
	5:00pm	70.6	68.5		60	ENE	0
1/1/2015	7:00am	68.4	67.3	72	56	NE	5
	9:30am	68.5	65.7			NE	5
	12:00pm	68.5	64.4		70	ENE	9
	2:30pm	68.2	65.3			E	6
	5:00pm	68.7	66.0		70	NE	4
1/7/2015	7:00am	67.6	63.5	70	41		0
	9:30am	67.6	64.8				0
	12:00pm	68.2	65.8		63	NW	5
	2:30pm	68.8	64.9			WNW	5
	5:00pm	67.2	63.7		63	W	4
1/8/2015	7:00am	64.8	62.4	69	32	NE	8
	9:30am	64.5	61.5			NE	13
	12:00pm	64.1	58.5		47	ENE	15
	2:30pm	65.4	59.0			ENE	10
	5:00pm	64.3	57.9		50	ENE	7
1/10/2015	7:00am	61.6	54.1	71	39		0
	9:30am	62.4	55.4			ENE	8
	12:00pm	63.7	58.1		58	E	9
	2:30pm	65.6	58.3			ENE	10
	5:00pm	64.7	55.4		61	ENE	5

		Mouth of Kings Bay <sup>1</sup>	Gulf near Shell Island <sup>2</sup>	Mouth of the Springs <sup>3</sup>	Ambient Air	Wind direction	Wind velocity <sup>4</sup>
Date	Time	° F	° F	° F	° F		
1/11/2015	7:00am	61.9	55.0	72	52	ENE	8
	9:30am	63.5	56.1			ENE	6
	12:00pm	65.2	58.3		72	N	3
	2:30pm	67.5	58.3			E	10
	5:00pm	63.6	56.8		72	ENE	5
1/14/2015	7:00am	70.1	62.2	73	30	WNW	4
	9:30am	69.6	61.8			NW	2
	12:00pm	70.1	63.7		68	ENE	5
	2:30pm	53.0	65.8			N	4
	5:00pm	71.2	63.9		67	N	5
1/15/2015	7:00am	69.7	64.0	72	52		0
	9:30am	69.0	61.7			W	4
	12:00pm	67.6	61.4		54	NW	5
	2:30pm	68.2	62.0			WNW	10
	5:00pm	68.1	63.2		51	W	8
1/17/2015	7:00am	66.6	62.6	72	40		0
	9:30am	66.6	61.2			NE	7
	12:00pm	66.3	58.8		NA	NE	5
	2:30pm	64.9	60.5			E	7
	5:00pm	66.4	61.0		70	E	5
1/18/2015	7:00am	67.1	61.3	72	52	N	0
	9:30am	68.2	62.6			W	6
	12:00pm	67.1	60.2		NA	WNW	10
	2:30pm	64.9	60.3			NW	4
	5:00pm	66.9	61.2		66	W	7
1/19/15	7:00am	66.7	60.8	68	39		0
	9:30am	67.1	62.4				0
	12:00pm	67.6	61.0		66		4
	2:30pm	66.0	60.4			NE	3
	5:00pm	65.7	61.6		61	N	
1/24/15	7:30am	67.1	64.6		48	W	21
	9:30am	67.3	64.8	72		WNW	12
	12:00pm	68.0	64.9		60	W	15
	2:30pm	68.0	65.1			WNW	11
	5:00pm	67.1	64.0		54	WNW	9
1/25/15	7:00am	64.4	60.3	ND*	38		0
	9:30am	65.3	61.5				0
	12:00pm	66.6	63.5		NA		0
	2:30pm	68.2	63.9			WNW	7
	5:00pm	66.4	62.4		NA		0
1/27/15	7:30am	64.4	58.6	72	44	N	0
	9:30am	63.3	58.1			W	11
	12:00pm	64.6	59.4		62	W	16
	2:30pm	66.9	61.5			WSW	15
	5:00pm	67.3	60.4		65	W	12

		Mouth of Kings Bay <sup>1</sup>	Gulf near Shell Island <sup>2</sup>	Mouth of the Springs <sup>3</sup>	Ambient Air	Wind direction	Wind velocity <sup>4</sup>
Date	Time	° F	° F	° F	° F		
1/28/15	7:00am	NA <sup>5</sup>	60.8	67	41	N	0
	9:30am	NA	58.3			NNE	5
	12:00pm	NA	58.8		60	N	6
	2:30pm	NA	60.3			NNW	5
	5:00pm	NA	59.9		60	W	4
1/29/15	7:30am	NA	61.0	72	36		0
	9:30am	NA	57.6				0
	12:00pm	64.6	57.6		65	E	5
	2:30pm	66.2	59.2			SSE	4
	5:00pm	67.3	59.2		66	W	8
1/31/15	7:00am	66.9	63.1	70	40		0
	9:30am	66.2	64.4				0
	12:00pm	66.0	65.7		NA	E	10
	2:30pm	65.3	64.9			E	9
	5:00pm	66.9	63.3		69	ESE	6
* USGS equipment malfunction							
ND not determined							
<sup>1</sup> <a href="http://waterdata.usgs.gov/usa/nwis/uv?02310742">http://waterdata.usgs.gov/usa/nwis/uv?02310742</a>							
<sup>2</sup> <a href="http://waterdata.usgs.gov/usa/nwis/uv?site_no=285531082412600">http://waterdata.usgs.gov/usa/nwis/uv?site_no=285531082412600</a>							
<sup>3</sup> Temperatures at the mouth of the Springs and ambient air recorded by data collectors							
<sup>4</sup> Wind direction and velocity data from Intellicast.com and Weatherunderground.com							
<sup>5</sup> NA - USGS equipment malfunction. No data available							

### Appendix III. Recorded Tide Height at the Entrance to Three Sisters Springs

Tide height was measured at the entrance to Three Sisters Springs by attaching 2 metal yard sticks to one of the pipes. Tide measurement were recorded every half hour beginning at sunrise.









